

Diabetes in Older Persons: Special Considerations

AT LEAST 40% OF ALL people aged 65 years and older have diabetes or impaired glucose tolerance: 10% are already diagnosed as diabetic, 10% have diabetes and are undiagnosed, and a further 20% have impaired glucose tolerance. There are several types of diabetes; the two major types are type 1 (patients are usually close to ideal body weight, ketosis prone, and cannot survive without insulin replacement), and type 2 (the majority are overweight, ketosis resistant, and can survive without insulin replacement, although insulin may improve glycemic control) diabetes mellitus. The majority of older persons have type 2 diabetes. Obese elderly type 2 diabetics have adequate circulating insulin, but marked resistance to insulin-mediated glucose disposal. Lean elderly type 2 diabetics have a profound impairment in glucose-induced insulin release but mild resistance to insulin-mediated glucose disposal.

Blood glucose levels increase slightly but significantly with age: fasting blood glucose concentrations increase by 1 mg/dl (0.055 mmol/l) per decade, and blood glucose levels 1–2 h after an oral glucose load increase by 6.8–13.0 mg/dl (0.38–0.72 mmol/l) per decade. The major defect responsible for this “glucose intolerance of aging” is peripheral tissue insulin resistance secondary to a defect in insulin receptor function at the post-receptor level. The extent of this age-related glucose intolerance varies with the population studied, and is reported to be minimal when moderated by exercise, diet, and diabetogenic drugs. Therefore the otherwise “inevitable” glucose intolerance of aging may be accentuated by factors other than biologic aging per se, and modifications in reversible factors including obesity, physical activity, and medications may postpone or ameliorate the evolution of the glucose intolerance of aging to diabetes.

The American Diabetes Association's Expert Committee on the Diagnosis and Classification of Diabetes Mellitus has recommended three possible ways to diagnose diabetes: (1) a fasting plasma glucose of >126 mg/dl (7.0 mmol/l; after no caloric intake for at least 8 hours), (2) a casual plasma glucose (taken at any time of day without regard to time of last meal) ≥ 200 mg/dl (11.1 mmol/l), with the classic diabetes symptoms of increased urination, increased thirst and unexplained weight loss, or (3) an oral glucose tolerance test (OGTT) value ≥ 200 mg/dl in the two hour sample. Any of these tests need to be confirmed on a subsequent day in order to verify the diagnosis. An additional recommendation is to screen all adults over 45 years of age at three-year intervals. Epidemiological data suggest that retinopathy begins to develop 7 years before the clinical diagnosis of type 2 diabetes. Also, because hyperglycemia in type 2 diabetes causes microvascular diseases and may cause or contribute to macrovascular disease, undiagnosed type 2 diabetics are at increased risk for coronary heart disease, stroke, and peripheral vascular disease. Earlier detection and treatment may reduce both the severity and complications of diabetes.

Classic diabetes symptoms—increased urination, thirst and unexplained weight loss—are not always apparent in the older diabetic. The clinical presentation is often insidious and asymptomatic. Changes in behavioral, cognitive, or functional status may include falling, urinary incontinence, agitation, dementia, delirium, or depression. Acute intercurrent medical illnesses such as urinary tract infection, pneumonia, myocardial infarction, or stroke can exacerbate a baseline glucose intolerance, making an individual with impaired glucose tolerance meet the diagnostic criteria for diabetes. Often treatment of the underlying health problem can reduce this exacerbation of glucose intolerance, allowing a return to diabetes management with diet and physical activity alone. Many medications have been associated with altering glucose homeostasis, and sometimes adjusting the drug regimen may obviate the need for oral hypoglycemic or other pharmacologic intervention.

An individualized and comprehensive care plan is recommended because older diabetics are a heterogeneous group. Some live independently; some live in nursing homes. Often there are associated comorbid and intercurrent health problems and varying cognitive and functional abilities. The current dilemma is to avoid both undertreatment and associated risks of long-term complications, and overtreatment with risks of immediate adverse reactions, especially hypoglycemia. Written instructions for patients and caregivers are important, especially in view of poor recall of verbal instructions.

When setting treatment goals, individual patient characteristics should be considered: capacity to understand and carry out the treatment regimen, risk for severe hypoglycemia, as well as other factors that may increase risk or decrease benefit, such as end-stage renal disease or advanced cardiovascular or cerebrovascular disease. The ultimate goals are relief of symptoms, maintenance of well being, and the prevention of complications. These require glycemic control, blood pressure regulation, and monitoring of serum lipid and lipoprotein levels. Age alone should not be used as an excuse for compromised blood glucose control. The risk of recurrent hypoglycemia may outweigh the benefits of tight control in those elderly with reduced life expectancy and diminished quality of life. However, persistent hyperglycemia can impair defense against infection, decrease the pain threshold and worsen neuropathic pain.

Non-pharmacologic therapy including diet and physical activity remains the cornerstone of management. Weight reduction should not be suggested in those over 70 years of age unless they are at least 20% above desirable weight. The restriction of dietary free sugars can be valuable in maintaining normoglycemia. Do not discount an exercise regimen. Although not all seniors are able to do 20 to 30 minutes of brisk walking three times per week, a graded physical activity program should be devised within the individual's capabilities.

Oral hypoglycemic agents are often used when an adequate trial of diet and physical activity fail to bring the blood glucose toward normal and the patient

becomes symptomatic. Metformin can be used in the relatively obese geriatric patient with no contraindications, for often there is an associated weight loss, which in conjunction with diet and physical activity may allow withdrawal of the medication. Instead of advanced age alone, renal function and/or any other age-related factors likely to contribute to lactate overproduction should be the basis for choosing Metformin therapy. In older persons, Chlorpropamide use is associated with a high risk for hypoglycaemia. Among the commonly used second-generation sulfonylureas, hypoglycemia is reportedly more frequent with Glyburide than with Glipizide.

Many older diabetics may already use insulin. Approximately 10% of those who develop diabetes over the age of 70 years have type 1 diabetes mellitus. Often in the setting of acute intercurrent illness, type 2 diabetics are managed with insulin. They can frequently switch to an oral agent after the acute episode subsides, thus avoiding potential adverse effects of insulin, including hypoglycemia and weight gain. Hypoglycemic

episodes including coma may be in the range of 20% per year when insulin is started after the age of 70 years.

In summary, aging increases the likelihood of type 2 diabetes mellitus with all of its inherent risks. Life style changes, treatment of underlying illnesses, and modifications of drugs may diminish glucose intolerance. When these efforts fail, oral hypoglycemic drug therapy is recommended, using biguanides and sulfonylureas, either alone or in combination, and finally insulin when these measures are not effective.

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